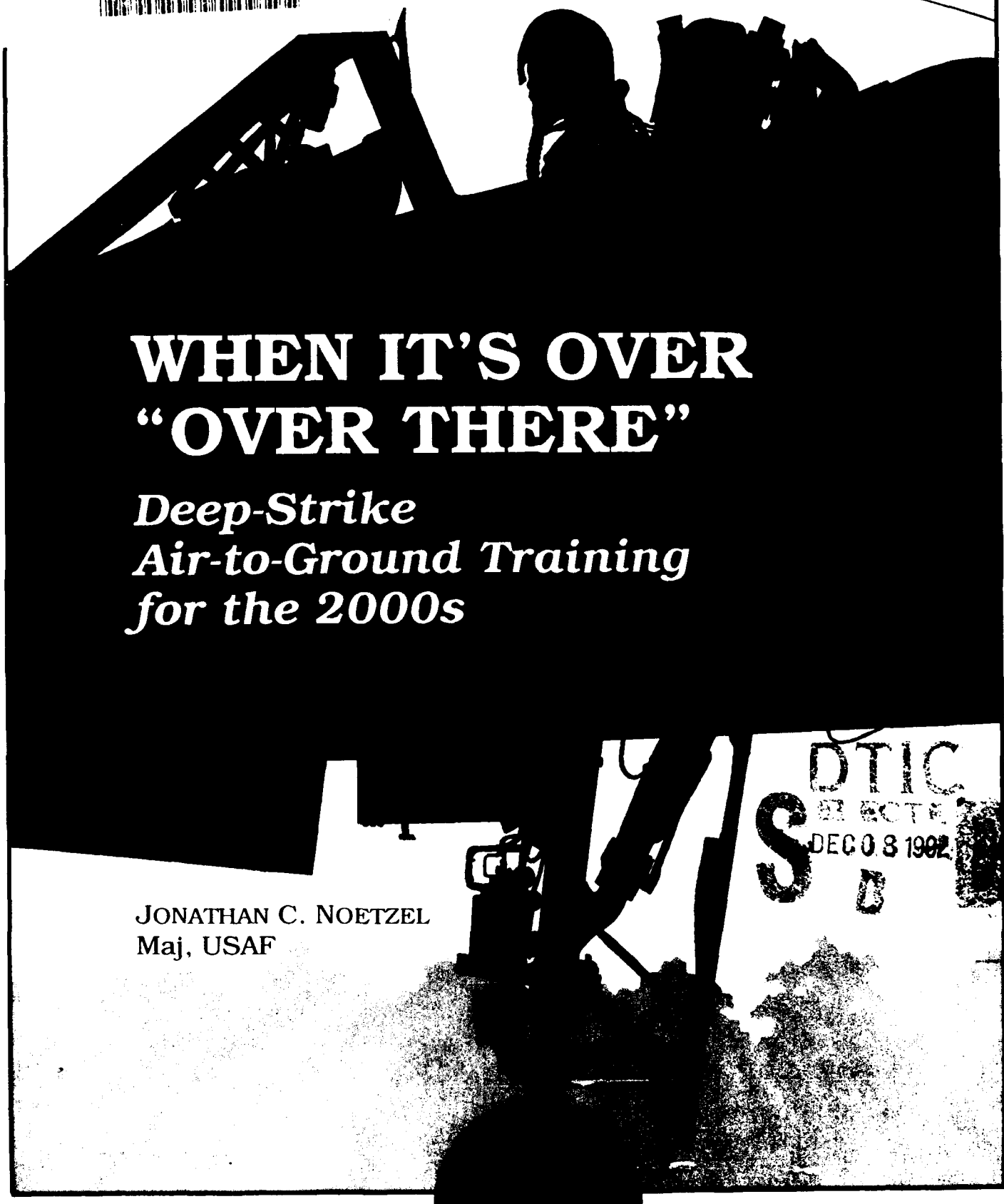

WHEN IT'S OVER "OVER THERE"

Deep-Strike Air-to-Ground Training for the 2000s

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Maj, USAF

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Noetzel

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When It's Over "Over There"

Deep-Strike Air-to-Ground Training for the 2000s

by

JONATHAN C. NOETZEL, Maj, USAF
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Air University Press
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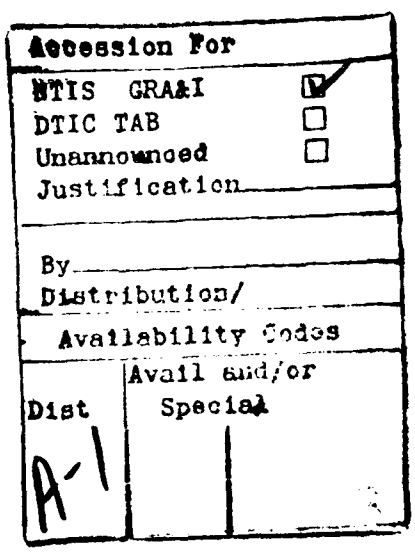


Contents

Foreword

Until recently, our fighter-bomber aircrews were trained primarily for only one theater. Current national military strategy and budget constraints are making that type of training program a cold war casualty. Our future, smaller force will be called on to do its job in a wide variety of terrain and weather. Precision guided munitions (PGM) will become the standard bomb load. Our PGM training program must prepare our crews for the various climatic situations they will fight in. Major Noetzel's proposal is timely and a well-thought-out plan to bring attention to this important, yet currently overlooked, part of aircrew training.

About the Author

Maj Jonathan C. Noetzel

Maj Jonathan C. Noetzel graduated from the US Air Force Academy (USAFA) in 1975 with a BS in chemistry. Following undergraduate pilot training at Vance Air Force Base (AFB), Oklahoma, his first assignment was to the 48th Fighter Interceptor Squadron at Langley AFB, Virginia, flying the T-33 and F-106. After this air defense assignment, he earned his MS in chemistry at the University of Michigan and received a follow-on assignment back to the USAFA's chemistry department in 1982. While assigned to the academy, Major Noetzel conducted a wide variety of research in computer-aided education and chemical process modeling. He was also a member of the initial motorized-glider instructors in the academy's "Soar-for-All" program.

Returning to the cockpit as an F-111 aircraft commander, Major Noetzel was assigned to the 48th Tactical Fighter Wing (TFW) at RAF Lakenheath, United Kingdom, in 1987. He was the "Fighting Deuce" flight commander in the 493d Tactical Fighter Squadron through 1988. He was subsequently assigned as branch chief and assistant division chief of the Operational Training Division for the 48th TFW. He was responsible for coordinating the training ranges and airspace for the wing's daily flying schedule and weapons training deployments (WTD). He is an instructor in the Pave Tack (laser guided) weapons system and is qualified in GBU-15 (TV-guided bomb) deliveries.

USAFE sponsored Major Noetzel's research for this report while he was assigned to the Air University Center for Aerospace Doctrine, Research, and Education, Airpower Research Institute (ARI). He—accompanied by his wife Debbie and their three children—remained at Maxwell AFB as a member of the first class at the School of Advanced Airpower Studies.

Preface

The Libyan raid in 1986 by F-111F aircraft from RAF Lakenheath heralded the future of the low-flying, precision guided bomber as well as its follow-on, the F-15E Strike Eagle. The raid was carried out by a relatively small number of aircraft in the middle of the night. Surrounded by secrecy, the raid required absolutely precise timing. Yet, the training program of the 48th TFW was frustrated by an increasingly restrictive training environment. Designated quiet hours throughout England and the Continent prohibited any true night training program from April through October. When the author completed Pave Tack training in the spring of 1988, not one Pave Tack crew was current in night-toss weapons deliveries. Despite increased emphasis throughout the rest of the author's tour, the most aggressive goal set for any squadron through the next two and one-half years was to have four Pave Tack crews qualified and current during October through April of each year. We never made that goal.

The training problem was not new. Even during the quiet buildup to the Operation El Dorado Canyon raid on Libya, the crews were not able to check out fully in nighttime Pave Tack deliveries. At least one weapons system officer (WSO) received his final night Pave Tack checkout during the raid.

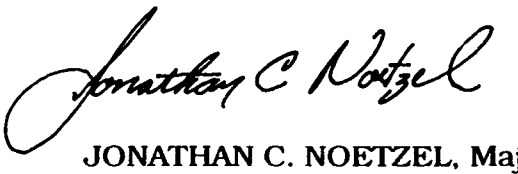
When the wing deployed to Operation Desert Shield in the fall of 1990, daily training continued to keep crews proficient in low-level Pave Tack weapons deliveries and to allow several new crews to be qualified in PGM deliveries. Fortunately, the five-month buildup allowed the crews to overcome two training problems: unfamiliar terrain and almost exclusively nighttime flying operations. These two shortfalls were present in 1986 and remained even after several attempts to overcome them during the ensuing years.

After the loss of an F-111 in October 1990, all training flights were restricted to no lower than 1,000 feet above the ground and remained so restricted until the war began. So, in the weeks prior to the war, our crews—Air Force–wide—could not practice the maneuvers required to survive in a war scenario. Anecdotes related to the author by several crews indicated that close calls with the ground occurred throughout the war and that lack of training may have contributed to the only F-111 loss.

In the future force, our low-level, PGM-capable aircraft and crews may be required to fight in any climate and terrain, worldwide. While we may not be able to ensure adequate training over the exact territory of the next conflict, this study offers a continuation training scheme for PGM-qualified crews that would allow them to be well trained in the major world climates and terrains. It reviews world political regions, climates, and terrain types. It then explores North American opportunities to train in these climates and terrains. Finally, it presents a proposed training program based on USAFE's WTD concept.

This is a concept study rather than an implementation recommendation. Implementation of the proposed program will require coordination with many agencies and negotiation with several NATO governments. Developing a WTD at only one of the recommended bases is a study in itself. My intention is to highlight a shortfall in the training of PGM crews who may be asked to deploy, perhaps on very short notice, anywhere in the world. This training deficiency can be corrected without building more bases or ranges, and the plan will keep the ground and aircrews proficient in mobilization as well.

This type of project is impossible without a host of people supporting it. My wife Debbie and our girls should all receive a standing ovation for their year-long understanding, acceptance of all those conversationless late nights at my desk, and countless votes of confidence which kept the project on track. My thanks to Colonels J. Lee Blank and Tom Lennon and Gen Michael Dugan (Retired) for encouraging my participation in the project; Dr Karl Magyar and Preston Bryant for their tireless review, patience, and rewrite recommendations; and the ARI staff for their help and support throughout the project.



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Chapter 1

Training Air-to-Ground Forces for the Post-Containment Era

For over 40 years, North Atlantic Treaty Organization (NATO) faced a numerically superior, well-trained, and technologically advanced opponent. While an initial Warsaw Pact (WP) attack from the Kola Peninsula in the north and toward the Aegean Sea in the south could have been part of an overall attack plan, traditional NATO strategy anticipated an attack by the bulk of WP forces through central Germany. The central NATO region forces trained for such an eventuality.

NATO's Traditional Training Requirement

To counter an attack through central Germany, the air campaign called for offensive counterair missions against enemy airfields, surface-to-air missiles (SAM), aircrew support facilities, and command and control targets throughout the WP region. To reach these targets, attacking aircraft had to negotiate a well-developed air defense network of SAMs, antiaircraft artillery (AAA), and air defense aircraft. These targets were critical to slowing the WP advance and therefore had to be destroyed, day or night, regardless of weather.

The survival of NATO's attack aircraft, and their mission's success, depended on their ability to evade air defenses while ingressing at altitudes less than 100 feet above ground level (AGL). The well-developed WP air defenses required attacking aircraft to fly as low as possible, using terrain as a physical barrier to avoid detection by SAM, AAA, and airborne fighter radars. Proper camouflage on aircraft flying at very low altitudes further complicated the enemy's intercept problem.

Improved SAMs, radars, tanks, and a host of other advanced weapons regularly updated European forces. While each opponent rushed to surpass and counter the enemy's latest weapons advance, tacticians improved methods for employing these new technologies. The introduction of SAMs forced the attacking aircraft down into the antiaircraft artillery regime. Early SAMs, such as the Soviet SA-2 Guideline, allowed fighters to fly up to 300 feet AGL without serious threat of being shot down. Later SAMs, such as the Soviet SA-6 Gainful and follow-ons, made even 100 feet AGL

dangerous for an attacking fighter. As weapons became more and more capable, our pilots had to fly lower and lower to avoid detection.

Western Europe's unique climate further complicated NATO's low-flying environment. Europe's large region of flat-to-rolling terrain allows moist Atlantic air masses to penetrate deep into the Continent. This flow produces extended periods of rain with low ceilings and poor visibility. Additionally, because of the relatively high latitudes, daylight is short in the winter (less than eight hours on 22 December) and long in the summer (more than 16 hours on 22 June).[1]

Today, except for the all-weather fighter-bomber, poor weather still precludes continuous air operations. However, poor weather is the home of the F-111 and F-15E. With their automatic terrain following radars (TFR), they can accomplish low-altitude ingress, PGM delivery, and egress in any weather, day or night, giving commanders a unique capability to continue the war.

Due to changing political, social, and military conditions, the continuing need to station these aircraft overseas has recently been called into question.[2] Marked progress in conventional arms reduction negotiations through the latter half of the 1980s changed the nature of the threat NATO had faced for over 40 years. Reductions in WP strengths, the reunion of East and West Germany, and increasing fiscal pressures in the US allowed the USAF to recommend a 25 percent reduction in forces by 1995.[3]

The Diminishing European Threat

The formal demise of the WP on 31 March 1991 capped a change in the overall mission of the deep-strike, PGM-capable F-111 and F-15E aircraft. While the Soviet Union still fields a formidable force, the offensive threat of WP armies has been severely diminished. Eastern and Western Europe have taken irrevocable steps toward increased regional integration. The initial battle line will move to the German-Poland border when the Soviets complete their departure from German soil in 1994. NATO's release of USAFE aircraft to United States Central Command (USCENTCOM) for Operations Desert Shield/Desert Storm is a clear demonstration of the reduction in perceived threat.

Though these are recent events, momentum for these changes has built over the last five years. Looking back on the late 1980s, it is relatively easy to follow the events which led to the dramatic change in the likelihood of war in Europe. President Mikhail Gorbachev, in a speech to the East German Party Congress on 18 April 1986, first signaled a fundamental shift in Soviet thinking about military strategy for Europe. He proposed substantial cuts in forces, accepted the need for dependable verification, and acknowledged that the European security problem extended from the Atlantic to the Urals.[4]

In May 1987, the Political Consultative Committee of the WP outlined its desire to have force reductions "to the level where neither side, in ensuring its defense, would have the means for a surprise attack on the other side for mounting general offensive operations."[5] Substantive progress toward a conventional arms reduction agreement began in earnest in 1988, with both sides pledging cuts but disagreeing over weapons definitions. The unraveling of the WP and the political upheavals of 1989 were allowed to run their course, further demonstrating the severed control of satellite governments by the Soviets. By early 1990, the unification of Germany became inevitable and events in Eastern Europe continued to signal a fundamental change in the political mind-set of WP nations.

Despite the rapid changes on the political front, USAFE training programs maintained NATO's readiness to defend the central region. The WP could conceivably reverse its disarmament stance and resume its previous military posture. NATO's victory was in sight, but its guard could not be dropped quickly.

Yet, day-to-day low-level flight training became more and more difficult throughout these years. By 1989, low-level training in Germany below 250 feet AGL was allowed in only seven relatively small areas.[6] Virtually no early morning or night flying, no flying during weekends or holidays, and a ban on low flying during the lunch hour from May through October severely limited the availability of low-altitude training.[7]

A large number of NATO aircraft accidents helped feed the demand for cessation of all low-altitude flying. During fiscal year 1988 alone, NATO lost almost 100 fighter aircraft to accidents.[8] An A-10 crash on 8 December 1988 finally led the German government to ban all fighter and attack flights until after the beginning of 1989. Six other NATO nations and USAFE agreed.[9] An entire month of training was lost.

Shortly after the resumption of low-altitude flying in NATO, the United Kingdom (UK) implemented a new system for controlling low-altitude flights over England and Scotland at night. The new system was cumbersome, and it guaranteed only three hours of nighttime low-altitude flying per week to each F-111 wing. On a typical night, each wing might need up to 15 two-ship missions with each mission requiring about 30 minutes of low-altitude flight and 15 minutes of bombing range training. The new controls simply precluded the required resources for both low-altitude and bombing training.

The nighttime low-altitude flight system revisions during the summer of 1989 helped alleviate the initial shortcomings, however. Area boundaries were redrawn and procedures were simplified. Several missions from a wing could work in the same low-flying area. Unit commanders were responsible for developing flight-path avoidance procedures for their wings.[10]

NATO and the WP, however, were on a path to reduce conventional force levels in Europe. Progress in Vienna in 1990 meant an agreement that year was likely. The US Congress had been debating NATO-dedicated force cuts for over two years; the USAF announced the closure of three bases in England.[11]

Force structures throughout NATO were under close scrutiny. Belgium was eager to withdraw its troops from Germany, as were the Netherlands and Great Britain.[12] Germany announced a reversal in defense spending growth by cutting its proposal for fiscal year 1991 by 4 percent.[13] USAFE staffs were finding ways to cut the 7.4 fighter wing equivalents stationed in Europe to 5.4 or less.[14] Ultimately, the decreasing threat of immediate war in Europe, the demise of the WP, and Soviet promises to remove all troops from Germany by 1994 signaled a fundamental change in the roles of US forces stationed abroad.

A Broader Mission

Prior to the Tripoli raid in 1986, the long-range and precision-bombing capabilities of the F-111 had never been used together in combat. Operation El Dorado Canyon demonstrated not only the tactical use of laser guided bombs (LGB), but the political benefits of limited collateral damage and civilian casualties. This capability subsequently allowed military leaders to avoid mass collateral civilian injuries in Desert Storm (1991).

One of the often-cited lessons learned from Desert Storm is the importance of PGMs. Hardened aircraft shelters and bunkers, tanks and other armored vehicles, and missiles and their launchers all felt the sting of PGMs. PGMs were the weapons of choice for these difficult targets, and many were employed. USAF Chief of Staff Gen Merrill A. McPeak, in his 15 March 1991 Pentagon news briefing, stated the US had used more PGMs in Desert Storm's 43 days than during the entire Vietnam conflict.[15]

The downsized future Air Force will have a limited number of deep-strike, precision-bombing aircraft. F-117A, F-15E, and F-111F aircraft, together amounting to only 266 operational aircraft, are and will continue to be the USAF deep-strike, precision-bombing force. Even in today's radar environment, the F-117A is very hard to detect; and it can bomb with relative safety at medium altitudes. Future radar improvements may force these aircraft, as F-111s and F-15Es already do, to rely on low-altitude ingress and egress with electronic jamming support.

Currently, crews assigned to NATO-dedicated aircraft train in low-altitude flying and bombing in a western European or UK setting with occasional trips to Spain and Turkey. Such training will not be sufficient for the forces of the 1990s and beyond. The success of the F-15E and F-111F in Desert Storm demonstrates their versatility in precision strikes and increases the likelihood of their use in any future military action.

Training for the Expanded Mission

The five-month Desert Shield buildup allowed the deployed crews to train extensively in the Saudi Arabian desert climate. Future conflicts can guarantee no such buildup luxury. The 1995 USAF will need to be able to deploy and employ immediately, anywhere in the world.

Training for this expanded mission must first account for the adversary's military capability. The program must also, however, accommodate the expected environment in which the air battle will be fought. Today's PGMs rely on either TV or infrared energy to guide the bomb to its target. Both guidance systems require relatively clear air. If clouds or haze obscure the target, no current aircraft-delivered PGM can hit it with certainty.[16] A partial obscuration is also difficult to plan for, since the weapon's release range is primarily dependent on the weapons system officer's (WSO) ability to see the target. Thus, aircrews need to practice in a wide variety of climates.

Because F-111 and F-15E PGM sorties will likely be critical in the next conflict, ground crews also require training in the climates in which they will generate sorties. The F-111F's future home (Cannon AFB, New Mexico), however, will hardly prepare ground crews for the weather on the Korean Peninsula or in the tropics of Latin America.

World Regions in Conflict

The prospective locations of the next battleground are varied. Certainly, the Middle East will continue as a turbulent region with relations between Arab nations and Israel plus a continuing Palestinian homeland issue remaining unresolved. US regional interest will remain high since its economic well-being is tied to the region's oil and long-standing alliance relationships.

Turmoil continues in Africa. US interests are mainly the mining of strategic minerals, oil, and the like. These industries are threatened by political and economic instability. The Horn region has been embroiled in civil war for decades. Famine and poverty plague Ethiopia, Somalia, Burkina Faso, and Mali, among others.[17] Insurgencies in Angola, South Africa, Ethiopia, Sudan, and Mozambique contribute to the region's instability. While these situations may not lead to large-scale US military action, contingency operations and noncombatant evacuation operation (NEO) missions continue to have significant potential.[18]

Similar contingency operations are also possible in South and East Asia, though East Asia's emerging economic base and decreasing Soviet influence have somewhat stabilized the region. Yet, the 1991 coup in Thailand suggests that long-term instabilities still exist. The ongoing dispute between India and Pakistan (over the Kashmir area), and their emerging nuclear capabilities, continue to identify South Asia as a highly unstable zone.[19]

"Latin America, so vital to our national security interests, is truly the 'soft underbelly' of the United States."[20] There are 27 insurgent movements in nine Latin American countries—25 percent of the region's republics.[21] Political authoritarianism, economic instability, and social injustice contribute to the social unrest and the insurgencies. Military coup has been a historically accepted way to change governments in many regions of the world; its dominance in Latin American countries cannot be overlooked.[22] Not only must the United States be prepared to help its neighbors defend themselves from within, but also from without—Cuban activism in the region has not been eliminated. Yet, reduced Soviet support for Cuba can reasonably be expected to reduce Cuban adventurism.

It is apparent that our forces may be required to conduct contingency operations, as well as conventional operations, throughout the world. These contingency missions will require a flexible, tailored force that is quickly deployable and ready to fight on arrival. The unique capabilities of the F-111 and the F-15E make them highly desirable for such operations. Aircrews must train in a variety of environments, and they must routinely practice mobilization. These exercises must also be conducted in concert with our allies.

Opposing Military Arsenals from around the World

Just as US deep-strike aircraft may be used in a wide variety of regions and climates, they may encounter a wide variety of defenses. The open arms market has made weapons available to any country with the cash to buy them. For example, Saudi Arabia recently purchased Chinese ballistic missiles, and more than 20 other third-world countries have either developed or bought surface-to-surface missiles (SSM).[23] Even though SSMs pose no direct threat to US airborne forces, they can draw PGM assets away from interdiction, counterair, and close-support missions. This was pointedly demonstrated by the Desert Storm F-15E Scud missile patrols.

In Desert Storm, US forces faced an array of internationally procured weapons operated by Iraqi forces. While the Iraqi arsenal was dominated by Soviet systems, they also used Chinese-made Silkworm antiship missiles, South African G-5 artillery pieces, and French F-1 fighters. They even had US-made Hawk antiaircraft missiles which they captured in the invasion of Kuwait. (There has been, however, no evidence that the Iraqis were able to use the Hawks.) It is highly likely that any future enemy will have an array of internationally procured arms.

Allied Cooperation

Every large-scale US conflict in the twentieth century has involved a coalition. It is highly probable that future wars will also involve coalitions. As the East and West begin to reduce their conventional forces, technologies are becoming more localized. The French Exocet antiship missile, the British JP233 runway-cutting system, and the US stealth and PGM

capabilities exemplify the unique capabilities of particular countries.[24] Thus, each country in the coalition will bring unique capabilities to the air campaign.

If the various "specialists" are to coordinate and combine their efforts, continued training with each other is necessary. NATO exercises have, in the past, required close coordination of multinational aircraft missions. NATO war plans for airspace coordination rely heavily on existing day-to-day procedures. With a reduction in European forces and exercises, fewer crews will be familiar with these procedures. This coordinated experience loss has occurred simultaneously with the broadening of F-111 and F-15E missions.

Without an effective training plan to maintain allied coordination, the US will lose some of its rapid-employment option. The unique capabilities each ally brings to the fight must be coordinated and packaged together to successfully bring the force to bear on critical targets. The composite wing experiment is an attempt, within US forces, to solve this problem. Within a theater, not only must US forces be coordinated, unique allied capabilities must be folded into the plan as well. Regardless of how fast US forces can deploy, the coalition will not be ready to fight until the issues of roles, missions, flight-path avoidance, and targets are resolved. A properly constructed allied training program would address many of these coordination issues prior to the battle.

Currently, the US participates in limited international training with allied forces. Team Spirit (in Korea) and Central Enterprise (in Europe) are two examples of multinational, large-scale, annual exercises providing such training. Their continuance is not guaranteed in the future, smaller, force. Several bilateral exercises are held semiannually or quarterly in both European Command and Pacific Command. Through a large reduction of US forces overseas, the allied tactical fighter forces could lose much of this training opportunity.

Additional international training is offered in the US through Red Flag exercises at Nellis AFB, Nevada. The Red Flag program affords excellent low-level and realistic threat training on a large range, primarily to US crews. Foreign air forces can participate on a regular basis, but are usually limited to 12 aircraft per nation annually, though participation by Canadian and UK forces is not so limited.[25] Additionally, the Red Flag plan expressly states that foreign forces' needs are not part of the planning process. Training scenarios are built for US requirements. On average from 1983 to 1987, only 95 foreign crews per year flew in the two-week-long exercises. Foreign participation in Red Flag exercises has, however, increased in recent years. In 1990, for example, 220 foreign crews were trained at the Nellis complex.

Increasing pressures against low-altitude flight in Europe will continue to make the Red Flag exercise attractive for foreign forces. A Red Flag improvement program includes expanding operations from the current 100 aircraft in each exercise to 130 aircraft. It is anticipated that foreign

participation needs will be met with this expansion and that the combined training for both US and allied crews will be enhanced.[26]

While increases in foreign Red Flag participation are encouraging, the training is limited to the mountainous Tactical Fighter Weapons Center (TFWC) ranges and the semidesert climate of southern Nevada. Tactics and procedures for other world regions will differ. Combined training at a variety of sites will continue to be important for tomorrow's leaner and more flexible forces.

Summary

The threat facing NATO has changed. The tearing of the Iron Curtain, Soviet promises of troop withdrawals/reductions, and the dissolution of the WP, all suggest a reduction in the threat of military invasion through the heart of Germany. Forces throughout the NATO alliance are downsizing—yet instabilities remain, worldwide.

The US could face armed forces directly threatening its interests in regions throughout the world. Military responses ranging from relatively limited contingency operations (El Dorado Canyon) to conventional arms employment (Desert Shield/Desert Storm) have demonstrated a continuing need for deep-strike, PGM-capable aircraft.

Training to meet this need is increasingly restricted in Europe. The public perception of a decreased military threat has led to a ban in low-altitude flying throughout the Continent. As of October 1990, the United Kingdom was the last European country allowing low-level flight training down to 250 feet AGL, day and night. However, UK's system does not have enough night-bombing range capability to maintain the required level of proficiency of the F-111s, and the introduction of LANTIRN*-equipped F-15Es further increases the night flying and bombing training requirements.

Training programs must be modified to accommodate broadened missions. NATO-dedicated crews must be ready to respond worldwide, without the luxury of the five-month buildup that Desert Shield/Desert Storm had. Training in wide varieties of climates and terrains, and in coordination with allied forces, is necessary to keep our leaner and more flexible forces ready to protect US interests in any part of the world.

Notes

1. C. E. P. Brooks, *The English Climate* (London: English Universities Press, 1954), 87.
2. House, *Long-Term Defense Spending: Hearings before the Committee on the Budget*, 101st Cong., 2d sess., 1990, 45, 58.
3. Lee Ewing, "Tactical Force to Shrink but Remain Active," *Air Force Times*, 8 April 1991, 8.

*Low-altitude navigation and targeting infrared for night.

4. Michael MccGwire, "A Mutual Security Regime for Europe?" *International Affairs* 64, no. 3 (Summer 1988): 371.

5. Ibid.

6. James Kitfield, "The Low-Level Ban," *Air Force Magazine* 74, no. 2 (February 1991): 53.

7. Keith F. Mordoff, "USAFE Study Likely to Recommend against Cutting Low-Level Flights," *Aviation Week & Space Technology* 130, no. 1 (2 January 1990): 95.

8. Ian Kemp and Andrew Slade, "100 NATO fighters lost in 12 months," *Jane's Defence Weekly* 10, no. 23 (10 December 1988): 1440.

9. Keith F. Mordoff, "NATO Fighter Training Flights in Germany Halted Until Jan. 2," *Aviation Week & Space Technology* 129, no. 25 (19 December 1989): 31.

10. Royal Air Force Flight Information Publication, *United Kingdom Military Low Flying Handbook, Edition 51* (RAF Uxbridge, UK: Headquarters, Military Air Traffic Operations), 209.

11. Michael Evans, "Fourth British Base Affected," *The Times*, London, 30 January 1990, 1.

12. Peter Southard, Ian Murray, and Michael Evans, "US Plans to Pull Out of 3 British Bases," *The Times*, London, 29 January 1990, 1.

13. Ian Murray, "Bonn to Cut Defence Bill as Peace Pays Big Dividend," *The Times*, London, 21 July 1990, 8.

14. Lt Col Paul C. Anderson, Headquarters USAFE/XPX, Ramstein AB, Germany, interview with author at Ramstein AB, 7 June 1990.

15. Gen Merrill A. McPeak, chief of staff, USAF, briefing, "The Air War in Desert Storm," 15 March 1991.

16. Certainly, accurately programmed cruise missiles might hit the obscured target, but this study focuses on deep-strike aircraft and the weapons they carry.

17. Tom Masland et al., "A Longing for Liberty," *Newsweek* 116, no. 4 (23 July 1990): 27.

18. Robert J. Blunden, Jr., *Tailoring the Tactical Air Control System for Contingencies*, Research Report AU-ARI-91-2 (Maxwell AFB, Ala.: Air University Press, June 1992).

19. Ibid.

20. Dr Bynum E. Weathers, "Factors Affecting the Emergence of Low-Intensity Conflict in Latin America," in *Low-Intensity Conflict in the Third World*, ed. Lewis B. Ware (Maxwell AFB, Ala.: Air University Press, August 1988), 81.

21. Ibid., 98.

22. Ibid., 100.

23. Seth W. Carus, *Ballistic Missiles in the Third World: Threat and Response* (New York: Praeger Publishers, 1990), xvii.

24. Francis K. Mason, *Tornado* (New York: P. Stephens, 1986), 120.

25. Headquarters Tactical Air Command, *COMTAC Exercise Plan 80, "Red Flag"* (Langley AFB, Va.: Headquarters Tactical Air Command, 1 October 1980), C-3-1.

26. Briefing, 4440th Tactical Fighter Training Squadron (Red Flag), subject: Red Flag 2000, Nellis AFB, Nev., 11 February 1991.

Chapter 2

The New Training Environment

The mission of the F-111s and F-15Es reassigned to the US requires an effective force deployable anywhere in the world at any time. As the raid on Libya in 1986 and the deployment to Operation Desert Shield (1990–91) demonstrate, these aircraft are likely to be used in any contingency operation. They perform roles which no other aircraft can closely emulate. The capabilities of these aircraft, which make them desirable for any operation, include deep penetration, automatic low-level terrain following, and delivery of precision guided munitions.

The training program to maintain these unique capabilities in the relocated wings will be constrained by practical, fiscal, and political factors. First, the training program already in place must remain essentially intact. The USAFE training program has evolved to cover the full gamut of operations in these aircraft. A grass roots examination of this program for possible restructure would not only be time-consuming but also would likely produce a very similar program. Second, although some new construction will be required to move these wings back to the US, current training resources must be used without additional construction unless absolutely necessary. Third, our close ties with NATO countries will likely continue, albeit perhaps under a different name. These countries would rely heavily on the US should a threat in Europe reemerge. Desert Shield further demonstrated the continuing need to exercise and train with our allies to the maximum extent possible.

The training program for the crews flying the F-111 is well developed within USAFE. Fundamental changes in the program may degrade or eliminate the unique capabilities of the aircraft and crews. Crews in all F-111s require routine low-level flight training. Additionally, the F-111F crews require training ranges where they can both fire the target-designating laser and practice full-scale weapons deliveries.

F-15E Strike Eagle crews also require low-level flight and PGM delivery practice, but will need to practice air-to-air intercepts as well. Because the Strike Eagle is still relatively new, the training program will continue to evolve. Changes will likely be in the area of particular events rather than fundamental missions. USAFE's F-15E training program will also need to remain essentially intact when the aircraft are relocated to the United States.

Efforts by the Congress to reduce annual budgets will certainly impact the military construction program at large, but some funds must neces-

sarily be spent to relocate the European fighter-bombers on a new US home base. For the purposes of this study, no funds are anticipated for the construction of new training facilities. Funds to improve or enhance existing assets will have to compete with the myriad of other DOD programs or be supplied by allied nations.

It is unlikely that the US will unilaterally withdraw its troops and support for NATO even if NATO's mission changes. Should political support for our deployed wings crumble, we would still remain in the command structure of the alliance. We must find ways to allay the NATO members' fears of minimal US commitment. Part of this maintenance of NATO ties will require a continuing Europe-specific training program. While an expanded worldwide commitment will require expansion of the overall training program, we must continue to provide realistic training for the European theater.

The expanded worldwide commitment is the most significant change for the returning aircraft. No longer can USAFE crews be content with English weather conditions and occasional training in Spain or Turkey. Because the next conflict could flare in any number of regions, these crews require a greater scope of operational proficiency and familiarity with a wide variety of climates.

Ground crew familiarity with a climate directly impacts aircraft availability. Whether a particular maintenance function can occur on the open ramp or must be confined to the hangar, simple maintenance of motor vehicles and availability of parts are concerns with which the ground crews wrestle on a daily basis. Unknown weather and new or unfamiliar supply procedures complicate the problem.

The aircrew likewise must make adjustments for differing climates. Only by practicing weapons employment in various atmospheric conditions can the crew partially compensate for weapons limitations and the loss of target detection ranges. The precision guided weapons common to both aircraft depend on the transmission and reception of visible or infrared light to achieve their accuracy. Clouds, thick smoke, and haze can seriously degrade target identification and laser designation. Additionally, both infrared and visible light systems depend on contrast between objects to produce a picture. Scenes lacking in contrast, such as tents in the desert or earthen mounds covered with snow, are difficult to see for both systems. Target detection with the F-111 Pave Tack infrared imaging and designating system can vary from over 70,000 feet (about 12 nautical miles) in the Nevada desert to zero feet in heavy fog or thick clouds.

Finally, specific tactics are dependent on weather and terrain. European operations planning always requires poor-weather contingency plans, whereas Red Flag exercises at Nellis AFB, Nevada, rarely need to use them. Terrain, too, can help or hinder. Large forested areas, for example, offer camouflage for the attackers whereas open desert and bright sun can double the visual size of the aircraft. The prospect of flying in many climates

and terrains forces commanders to consider the consequences of not incorporating the environment into their attack plans.

World Climates Outside the North American Continent

The climates of the world have been extensively studied and classified. From a broad perspective, they can be divided into five classes based on temperature and precipitation. A regional climate overview should be helpful to planners developing a continuation training program within the North American continent for a worldwide commitment.

Western Europe is the largest area of cool, temperate oceanic climate in the world. Unlike the western Americas, western Europe has no mountain ranges to slow and raise water-laden maritime air. Its terrain is generally rolling, tree-covered hills with mountains in the south-central portion. The region lies in the latitudes traversed by both polar and tropic air masses. The exchange of these air masses can cause, within only a few days, changes from mild to cold weather in winter or from hot to cool in summer; a few days of rain can be followed by a dry period that may be cloudy, cold, and foggy or clear, warm, and sunny. Rain falls in all seasons and temperatures average above freezing. "Variability" characterizes western European weather.[1]

Most of the Middle East, the northern one-third and the southwest of Africa, and central Australia have either desert or steppe climates. Evaporation exceeds precipitation in both climates—in a desert, evaporation exceeds precipitation by twofold or more. Temperatures are rarely below freezing. Vegetation can be sparse to nonexistent in these climates, but irrigation provides water for crops in some areas. The terrain varies widely from shifting sandy desert to rugged mountains. These regions see less cloud cover than other regions.[2]

Eastern Europe and central eastern Asia (south of 50 degrees north latitude, including Manchuria, the Korean Peninsula, and Japan) share a common climate. They see precipitation at all times of the year. Clouds cover the sky more than 50 percent of the time from May through mid-September. Frost is likely from mid-September through May. The terrain is dominated by rolling, forested hills bordering mountain ranges north and west.[3]

Central South America, central Africa, Southeast Asia, southern Central America, northeast Australia, and vast areas of the sea are tropical. Inland areas are frost-free and coastal regions have a lowest mean monthly temperature of 18 degrees Celsius (18° C). Rains appear from 10 to 12 months near the equator with increasingly dry winters and rainy summers toward the poles. Rain forests or jungles cover generally rolling terrains.[4]

North and central Asia are characterized by both polar and boreal climates. Boreal climates have one to three months with average tempera-

tures above 10° C, while average temperatures in polar climates never exceed 10° C. Severe winters are common, and most of the limited precipitation falls during short, intense storms. The terrain is generally flat and tree-covered, with the trees thinning to the north and the flats yielding to mountains in the south.[5]

North American Climates

Many of the climates discussed above are essentially duplicated in our own backyard. Canada and the United States provide a wide variety of terrains and climates. In fact, all the major climates except tropical dominate some region of the continent.

A small region along the western coast of the US and Canada emulates the western European climate. Significantly though, the average winter temperature is some 12° C cooler in North America. This results in more precipitation falling as snow and remaining longer at lower altitudes in North America versus Europe.[6]

The US desert Southwest closely parallels the steppe/desert regions of the world. True desert conditions exist in southern Arizona while a steppe climate dominates eastern Colorado, eastern New Mexico, and much of Nevada and Utah. Short, intense storms typically bring precipitation. Mountainous terrain is available throughout the region.[7]

A large area of the continent closely parallels eastern Europe and far eastern Asia. This area is roughly defined by 40° N latitude on the south; Edmonton, Canada, to the northwest; a line running southeast through the Great Lakes; and a line running eastward to the mouth of the Saint Lawrence River. It contains a large variety of terrain.

The climate in northern and central Asia is emulated by that of northern Canada and Alaska, relatively uninhabited areas that have extensive regions of boreal and polar climates. The region contains virtually all types of terrain, as well as large areas of wooded plain and tundra to the east and north. Mountainous terrain is extensive in the west.[8]

Training Ranges in the United States and Canada

At the heart of the air-to-surface training program are the weapon ranges. It is on the weapon ranges (and in combat) that the aircrews culminate their training in trying to hit a specified target. The size of a designated range area depends directly on the availability of government-owned land, the type of weapons deliveries required, and the weapons footprint; that is, the area the munitions will affect.[9]

Air Combat Command manages the 18 USAF and 24 USN/USMC air-to-ground ranges of varying types in the continental United States. Eleventh

Air Force (formerly the Alaskan Air Command) manages the four ranges in Alaska. The Fighter Command of the Royal Canadian Air Force manages two ranges in Canada. Because each range has unique capabilities and equipment, the facilities of each range must be matched with the goals of the training program.

Ideally, the USAF would have several fully equipped ranges located in the various climate regions of the continent. Each wing could be based at one of these locations and periodically deploy to the others to become familiar with the climate there. Such a situation does not currently exist, and budget constraints do not allow the construction of new bases or ranges. We must, therefore, identify those bases that have the essential capabilities to conduct this specialized training: monitoring and supervision, tactical target arrays, low-level ingress and egress routes, laser designation authority, and joint/combined operations.

Training ranges are categorized as one of three classes, based on the monitoring and supervision given. Class A ranges are manned by trained range officers located at the range itself. Class B ranges use remote sensors to monitor range activities. Class C ranges are unmanned; the flight crews are responsible for range operations. Only class A and B ranges provide independent scoring for bombing. Additionally, only on class A and B ranges can the monitor provide safety warnings of approaching aircraft, weather, and so forth.

Tactical target arrays are built to simulate weapons bunkers, tanks, runways, aircraft, convoys, command and control bunkers, and AAA and SAM sites. Circular conventional training targets serve a valuable purpose while a crew initially becomes proficient in conventional bombing, but they are of little use when the crew needs training for realistic targets. Finding the proper target, either visually or on the radar display, is often the most difficult part of the mission. But it is essential—realistic targets are a must!

Training for a modern threat in any part of the world must include defense against current antiaircraft systems. Low-level ingress into the target area is considered necessary for successful penetration of "high threat" defense systems. Likewise, low-level egress of a wartime target area is considered essential.

All current tactical fighters can employ PGMs such as GBU-10/12/24 laser guided weapons. While crews do not routinely practice with these expensive weapons, each qualified crew should release and guide at least one of these weapons during upgrade and yearly thereafter. Even if a PGM training weapon is not employed, actual firing of the designating laser should be part of the training program.

As the two world wars, the Korean conflict, the cold war, and Operation Desert Storm have demonstrated, a coalition will be likely in any future conflict. Training with our allies, particularly those of NATO, is required to keep joint and combined operations a viable option for political leaders.

In addition to the essential range capabilities, other capabilities are highly desired. These include night operations, air combat maneuvering in-

strumentation, air-to-air combat, electronic threat generators, and electronic countermeasures.

A complete training program would allow at least some night training. Current training for the two-man crew of the F-111 requires three sorties at night and four night weapons deliveries each six months.[10] Proposed training tables for the F-15E reflect similar requirements.[11]

Those who have flown on the Nellis AFB range complex and have experienced its air combat maneuvering instrumentation (ACMI) system attest to the value of a "no lies" reconstruction of the attack. The system provides an unbiased display of aircraft parameters throughout the recorded attack profile. Ingress, egress, and specific tactics can be analyzed in the debriefing, even for a large composite attack force. Further, overall attack effectiveness can be analyzed along with individual attacks and responses to simulated threats.

Attacking forces face threats not only from ground-based weapon systems, but also air defense aircraft. The F-15E is a dual-role fighter; after accomplishing its bombing mission, it can enter the air battle. A complete advanced training mission would include a bombing run followed by an air defense fight in support of the returning attackers.

Ground-to-air threat simulators enhance awareness of enemy weapons capabilities. Both unmanned and manned systems should be available at each range, but operational costs preclude a large number of manned systems. Nevertheless, even a limited number of manned sites equipped with recording detectors can be very effective. "Where feasible, threat equipment should be collocated with ranges to provide the environment needed to support realistic training and tactics development."[12]

Proper management of electronic countermeasures (ECM) is essential to the wartime survival of the crew. During the mission debriefing, television recorders can be used to show the effect these countermeasures had on SAM or AAA sites. This type of training improves ECM tactics.

Thirteen US ranges, three of which are in Alaska, and two Canadian ranges meet the essential elements above. All also have one or more of the highly desired characteristics.

United States Ranges

Tactical Fighter Weapons Center (TFWC) at Nellis AFB, Nevada, is the prime example of a fully integrated range complex. It contains the largest array of controlled airspace, protected land, reporting equipment, and threat simulators in the USAF. Return of the F-111s and F-15Es to the US affords the opportunity to further develop integrated tactics with sister services and allies.

The Fallon complex in western Nevada, owned by the US Navy, is also a large and fully integrated complex. A complete training program is possible, including a full range of electronic combat (EC) simulations. It is the Navy's counterpart to the TFWC.

The 2.6 million-acre Goldwater range in Arizona maintains a full complement of facilities except for EC simulators. It is primarily used for upgrade training of F-16 and F-15 crews, but limited training time is made available for visiting crews. Electronic combat training must occur at another training location.

Avon Park Complex, covering 101,029 acres (157.8 square miles) in central Florida, offers all of the essential and desired training events for air-to-ground units. It is the primary air-to-ground training site for the F-16 upgrade program at MacDill AFB. It does not have air-to-air combat capability or ACMI capability.

The Utah Test and Training Range (UTTR) covers more than 3,500 square miles, including military operations areas (MOA) surrounding the restricted airspace. It has all essential facilities for air-to-ground training except for electronic combat.[13]

Saylor Creek range in Idaho has been used for Mountain Home AFB F-111 training for years. It has ample low-level entry and exit capabilities, as well as conventional and tactical training target arrays, and it maintains two squadrons of EC jammers (primarily to support EF-111 training). It lacks routine air-to-air, ACMI, and live-ordnance training.

The two remaining Air Force ranges (Edwards in California and the Eglin complex in Florida) are used extensively for testing aircraft and weapons. Both ranges have the essentials for air-to-ground training. Both allow the use of ground-based and airborne lasers. Neither has EC simulators nor ACMI capability.

The US Marine Corps' Cherry Point range is located on the coast of North Carolina. The primary users are aircraft of the Atlantic Fleet and USMC aircraft stationed at Marine Corps Air Station (MCAS) Cherry Point. The Cherry Point range lacks EC and air-to-air capability.

Naval Air Station Jacksonville, Florida, is the primary user of the Pinecastle complex. The two Pinecastle ranges meet all criteria except for air-to-air and ACMI capability. While the Navy uses these ranges extensively for day-to-day training, joint exercises there could be mutually beneficial.

All three Alaskan training ranges are located within 50 miles of Eielson AFB. Large areas of uncontrolled airspace surrounding each of the ranges allow extensive low-altitude flying. The three ranges (one class A, two class B) are controlled by the US Army, but an interservice support agreement authorizes the Air Force to use them.

Blair Lake, the class A range, is owned by the Army, but a sole-use agreement allows the Air Force to control it on a routine basis. Located 22 miles from Eielson AFB, Blair Lake has a conventional target array as well as targets for applied tactics. The range allows varied attack profiles and weapons, but neither laser guided nor Mk 84 (2,000 lb) practice bombs are allowed. Up to four aircraft are allowed on the range at the same time, both day and night.[14]

Area R-2202 includes the Oklahoma and Delta Creek impact areas, both of which are available for air-to-air and air-to-ground weapons training. Neither area provides a controller, however, so the training crews themselves must ensure flight safety. Virtually all common practice munitions are authorized, as are flares, chaff, live strafe rounds, and live Mk 82/Mk 84 weapons. Bombing scores, provided by a television scoring system, are recorded on videotape and are available for debriefing purposes. Multiple flights can be on the range simultaneously, as long as positive control is assured by one flight leader.[15]

The remaining range is found in area R-2205. The Stuart Creek impact area contains numerous tactical targets. The area is controlled by the Army, but Air Force use is allowed through a dual-use agreement. It is a class B range, and its target scoring system is similar to that at R-2202. Electronic-threat simulators are available, and there is no restriction on the number of aircraft in the area during daylight. Night operations are restricted to four aircraft and one forward air controller. Both ground and airborne lasers are authorized, but airborne laser use must be coordinated 30 days in advance. (Routine airborne laser use would require a permanent authorization.) Only guns and small practice munitions are authorized. Random entry and exit from the adjacent MOAs are authorized.[16]

R-2205 also maintains unique EC simulators for the attacking crews. Eight different emitters (including smoky SAMs and AAA), along with radio jamming and video documentation, enhance the realism available on this excellent range. Its only detracting characteristic is that only practice munitions are allowed.[17]

Canadian Ranges

Canadian Forces Base (CFB) Cold Lake, Alberta, has all the desired equipment for air-to-ground training. The range provides ready access to a wide variety of targets, both nuclear and conventional. The tactical target array includes airfields, storage depots, SAM/AAA sites, truck convoys, a motor rifle division, and an industrial complex. The weapons impact area, located within 20 miles of CFB Cold Lake, is approximately 98 miles long and 40 miles wide—nearly 4,000 square miles of land.[18] It is continuously operated as a restricted area from the surface to infinity, seven days a week. The restricted-area status protects training aircraft from routine air traffic at all altitudes.

Two low-level navigation routes provide good low-altitude flight training. Unfortunately, only one (IR 925) of these routes is currently available every day of the year. IR 920, the other training route, is currently scheduled only four days a year and even then requires a complete overfly of the route to determine the suitability of the weather on the day of proposed use. This restriction certainly limits the utility of the route—perhaps unnecessarily so, since both the F-111 and the F-15E are capable of full terrain-following flight in all types of weather.[19]

The Cold Lake range also has a good capability for ECM training. Recent exercises have included simulation of a ZSU 23-4 AAA piece and simulations of SA-2, SA-3, SA-6, and SA-8 SAMs.

CFB Goose Bay, Labrador, is in a fairly remote area. Little upgrade work had been done before 1981 when the German Air Force (GAF) began using this facility. By 1986, the GAF sortie rate had increased to more than 3,200 per year by four types of aircraft. Also in 1986, the British Royal Air Force (RAF) flew over 1,600 flights and the Dutch signed a 10-year agreement to conduct over 3,000 training sorties per year. The RAF, the Dutch, and the GAF continue to use CFB Goose Bay.

Because of its remoteness, the Goose Bay area contains few man-made threats (buildings, antennae, power lines) to low flying. There are two ranges, one north and one south of the airfield. Neither allows live munitions drops, and neither has ACMI facilities nor EC simulators. Nevertheless, Wing Comdr William M. Burnett of the RAF comments, "We've got an elementary range in the south, which is ideal because it gives you tactical freedom to go in all directions. . . . [All] the ranges in the UK and Germany are very structured. So we find the range here is very good value."[20] The terrain, with marshy flatlands as well as hills, mountains, and lakes, is similar to that of Europe. Lt Col Fred K. Schneider of the GAF said, "Even if the ground structure of the man-made influence is not there—there's only nature out here—you have about the same scenery here in Labrador as the hilly area of Germany to the south."[21]

CFB Goose Bay also offers another particularly attractive training asset: It could accommodate combined operations training more easily than any other range because several nations already support operations there. If the US were to return F-111s and F-15Es to the United States unilaterally, NATO might want some assurance of the continuing US commitment to the alliance. This range is able to support combined training, and its use could demonstrate that commitment.

Ranges and Climates

Of the 48 training ranges in North America, only 15 are adequately equipped for the advanced training necessary to maintain the proficiency level required for a worldwide, deep interdiction, air-to-ground force. Four of these lie in the boreal climate zones of Alaska and mid-Canada. Here, nonarctic training possibilities commence toward the end of February and can run to November. Maritime polar air masses, which are common throughout these months, can produce conditions similar to those found in the winter months on the European continent.

Alaska and CFB Goose Bay offer a viable training scenario for climates typical of Europe and subarctic Asia. Both range areas contain relatively flat to rolling terrain that is mostly forested. In addition, CFB Goose Bay

offers coastal attack/defense training and has already won the vote of our European allies as a suitable alternative to training in their home countries.

Central Alberta can realistically emulate the conditions found in central Europe at its worst. The region clearly had a major impact on the success of Maple Flag 1986, which ran from April through May of that year. The final report on the exercise noted the importance of building adverse weather into the attack plan.

> It may be possible to use a pop maneuver to acquire the target and deliver weapons. However, threat density and weather conditions must be taken into account.
>
> If weather is marginal in the target area, preplanned alternate targets may be a good option to allow expenditure of ordnance over hostile territory.[22]

Planning for adverse weather has been one of the enduring challenges for the European environment. During five months of the year, targets in the west central area of Germany experience a ceiling of less than 1,500 feet and visibility under three miles for more than 30 percent of the time.[23] CFB Cold Lake offers training in this type of climate during the spring. CFB Cold Lake's dominant climate is most similar to eastern Europe.

The arid and semiarid regions of western North America contain six of the remaining ranges, including the TFWC and Fallon complexes. There is little difference in these ranges other than the increased average temperature as one moves south from Saylor Creek to the Nevada sites and westward to the Edwards range. Any of these ranges can provide arid/semiarid climates, and they maintain good PGM training sites. The TFWC and Fallon ranges can also accommodate combined operations, although user fees at the TFWC aggravate an already costly deployment for foreign forces. The terrain, generally mountainous with large flat plateaus between mountain ranges, makes for challenging low-altitude flying and excellent training for desert or steppe climates.

The remaining four ranges lie in the large subtropical, humid region of the southeastern United States. The overall climate there is dissimilar to any other large region in the world, yet summers can approximate tropical temperatures and humidity while winters can emulate east European and northwest Asian summers. The Marine Corps' Cherry Point range, which lies on Cape Hatteras, sees a mix of warm subtropical weather from the south and cooler continental weather from the north. The remaining three southeastern US ranges offer a more traditional humid, subtropical climate. All four ranges are flat, sandy, and tree-covered.

Range Training Capacity

All the ranges discussed are used for daily training and exercises. To include another squadron or wing-sized unit in the schedule may be difficult or impossible, depending on the specific base and time of year. For example, even during Operation Desert Storm, Goldwater range was in use daily by

F-15, F-15E, C-130, AV-8, F/A-18, OA-10, and F-16 aircraft. Use of the Goldwater complex by more than a four-ship unit of TDY crews would be difficult to schedule on a routine basis.[24]

The proposed USAF drawdown includes a reduction of nine fighter wing equivalents. An approximately one-third reduction in fighter forces will reduce the demand for some range assets. However, ranges will not be affected equally. Because "flag" exercises are highly valued by crews and commanders, training at Eglin, Fallon, and Nellis ranges will remain in high demand. Other ranges, particularly those with less capability, will see less use. Still other ranges, such as Melrose, may see improvements as the F-111G wings become fully equipped.

Determining the feasibility of specialized F-111 and F-15E training at a particular range depends on the length of time each wing or squadron would be deployed, the current level of use by assigned units, and the number of aircraft and personnel a supporting base can accommodate. Some ranges can be used by aircraft from one or more bases. For example, aircraft from either Nellis AFB or Indian Springs auxiliary airfield could use the TFWC. Deploying aircraft to both locations simultaneously could increase the number of aircraft with access to the Nellis ranges. Additionally, TDY costs are significantly less at Indian Springs primarily because per diem is much less than for Las Vegas.[25]

Summary

Virtually all required training of the fighter-bomber force returning from Europe for a broader worldwide mission could be accomplished in North America with one important exception: day-to-day coordination (communications, control procedures, regulations, and the like) with foreign ground controllers, which USAFE crews now maintain, would disappear if training remained wholly within the United States. Still, two ranges (CFB Goose Bay and TFWC) have ongoing, multinational, combined operations. They offer the possibility of a continuing air traffic controller exchange for training, but no such program currently exists at either site.

All but one of the major climates of the world are found in our own backyard. Adequate facilities exist in each region to train effectively under each climatic condition. Since the basic training program will stay intact, a creative deployment schedule will be required to keep ground and aircrews familiar with a variety of climates and terrains they are likely to encounter in the next conflict.

Notes

1. Denis Riley and Lewis Spolton, *World Weather and Climate* (Cambridge, UK: Cambridge University Press), 113.
2. Ibid., 99.

3. Ibid., 98–99.
4. Ibid.
5. Ibid.
6. Ibid., 111.
7. Ibid., 104.
8. Ibid., 98–99.
9. AFR 50-46, *Weapon Ranges*, 8 June 1987, 6.
10. Multi-Command Regulation 51-50, "USAFE Tactical Fighter/Reconnaissance Aircrew Training," vol. XXX, draft, 17.
11. Briefing, Headquarters TAC/DOT, subject: LANTIRN Concept of Operations, 1 June 1987.
12. AFR 50-46, 6.
13. Flight Information Publications, *Area Planning AP/1A* (FLIP AP/1A), 23 August 1990, 78.
14. AACR 50-46, *Alaskan Weapons Ranges*, 28 February 1990, 22.
15. Ibid., 17–19.
16. Ibid., 24–26.
17. Ibid., 27–28.
18. Paul Mann, "Cold Lake Matures into Strategic Base," *Aviation Week & Space Technology*, 28 September 1987, 129.
19. FLIP AP/1A, 20.
20. Paul Mann, "Goose Bay Modernizes, Prepares for Air Defense Role with CF-18," *Aviation Week & Space Technology*, 5 October 1987, 86.
21. Ibid.
22. 4440th Tactical Fighter Training Group (Red Flag), *Maple Flag XVII Final Report* (U), Nellis AFB, Nev., 22 July 1986, 4. (Secret) Information extracted is unclassified.
23. Briefing, Headquarters USAFE Deputy Commander for Operations, Analysis Division, subject: Weapons Training Deployment Alternatives, June 1990.
24. MSgt Michael Quintana, 832 Combat Support Group/AOR, telephone interview with author, 8 February 1991.
25. Phil Thayer, Headquarters USAFE/DCA, interview with author at Ramstein AB, 1 June 1990.

Chapter 3

Continuation Training for the 2000s

We have identified the capabilities of the various ranges throughout the US and Canada that could support the specialized training of the F-111s and F-15Es returning from Europe. How these facilities might be used in a comprehensive training program to meet the worldwide mission is another issue.

Although the returning F-111Fs will base at Cannon AFB, New Mexico, the basing plan for the returning F-15Es has not been determined.[1] Since the returned air wings will require training resources similar to those in Europe, they could be stationed at one of the fully integrated ranges. If so, some of the current exercise capability of that base would be displaced. The training program should therefore expand to meet the requirements of worldwide employment.

Because both the TFWC near Nellis AFB, Nevada, and the Fallon complex near NAS Miramar, California, hold continuous air-to-air, air-to-ground, and electronic combat exercises,[2] stationing another entire wing of aircraft at either base would reduce availability of the integrated range to other units—and TAC policy required each fighter unit to participate in an appropriate "flag" exercise every 15 months (active duty) or every other year (Air National Guard or Reserve).[3] Clearly, another wing of aircraft competing for the same range for daily training would adversely affect this program. Stationing another wing at either base is therefore unlikely.

Alternately, the fighters could be stationed at a base from which one of these ranges would be within their combat radius. For example, one wing or more could be stationed at Mountain Home AFB, Idaho. Both the UTTR and the Nellis range complex are within reasonable distance for either aircraft. Mountain Home also has its own range (Saylor Creek) for daily training, but air-to-air combat and ACMI are not available at Saylor Creek. This means routine air-to-air training for F-15E crews would require either the UTTR or the Nellis complex.

Fortunately, the proximity of these ranges to Mountain Home AFB could allow routine training as part of a Red Flag exercise at Nellis or on a scheduled basis in the UTTR complex. This proximity allowed EF-111 and F-111 squadrons stationed at Mountain Home to use these ranges prior to the EF-111s' move to Cannon AFB and the A-model's retirement from the inventory. Cannon's F-111D aircraft occasionally participate in TFWC's

Red Flag exercises, but only because the F-111D has a sufficiently long combat radius. Cannon AFB fighter crews receive a telephone mission briefing from the mission commander at Nellis, fly the mission, and either return to Nellis for refueling or, with air refueling, return to the New Mexico base. Such training requires the "off-station" crews to forgo either a detailed premission brief with the rest of the exercise crews or an extensive postmission debrief reconstructing the mission, critiquing the aircrew's defensive maneuvering and equipment, and improving tactics.

The crews occasionally stay at Nellis overnight to take part in the debrief. Of course, additional per diem costs are incurred and maintenance on the aircraft sometimes delays their return to Cannon. This situation could be avoided if the aircraft were deployed to Nellis for a short period. For a variety of reasons (i.e., no in-place maintenance, fiscal constraints), however, such deployments are not routinely done.

Whether the aircraft use one of the fully integrated ranges after a long flight to join an exercise or deploy to the base for a short period, the necessary training can only be obtained by flying to a suitably equipped range. Further, deployment to other climates will still be required to ready aircrews for worldwide employment.

Short-term deployments would preserve at least two additional capabilities that support crews must maintain: mobilizing in a crisis and cross-servicing equipment between services or nations. The need for both was highlighted by Operations Desert Shield/Desert Storm (1990–91).

In late 1989 and early 1990, a lessening Soviet threat, a forecast of reductions in in-theater assets, and a NATO belief that USAFE air assets would remain committed to Europe allowed commanders to lower the mobility-readiness requirements of many units. Wings were no longer required to muster all men and materiel during evaluations for mobility contingencies.[4] Air and ground training focused on the European theater. Then the rapid nature of the large buildup in support of Operation Desert Shield drove home the necessity to be ready to mobilize at all times. Units from throughout USAFE deployed to the Arabian Peninsula.

Though mobility requirements lessened, USAFE flying units maintained a high readiness to deploy through a program primarily designed to maintain weapons delivery proficiency. The weapons training deployment (WTD) enables flight crews to practice weapons deliveries and tactics that are unavailable at their home base. Four WTD bases in USAFE support air-to-air (Decimomannu AB, Italy) and air-to-ground training (Incirlik AB, Turkey; Zaragoza AB, Spain; and Aviano AB, Italy). Deployments each year to these bases maintain the aircrews' familiarity with the entire mobility process. Mission planning cells, preplanned cargo loads, and austere location maintenance requirements were already prepared and ready to use when Operation Desert Shield began. The experience gained through

deployment on a recurring basis helped USAFE units to deploy with adequately trained personnel.

Likewise, the ability to maintain other services' and other nations' aircraft has been a requirement recognized by NATO planners for some years. Current war plans augment the theater's aircraft inventory by staging various nations' aircraft at existing forward bases. To support this requirement, aircraft routinely fly to bases of other nations to train and evaluate the cross-servicing capability of host nation ground crews.[5] Aircraft of several nations share common bases and support facilities. Familiarity with each other's equipment maintains flexibility and directly impacts the war-fighting capability of the coalition forces. Desert Shield demonstrated the need to maintain such a cross-servicing capability.

Future conflicts will likely involve coalition forces as well. While we cannot hope to train directly with every possible air ally, the lessons learned in overcoming barriers to combined operations would prove invaluable to the future theater commander. When the Aardvarks and Strike Eagles return from Europe, routine training deployments and combined international exercises will be necessary to keep their crews ready for worldwide employment with coalition forces.

Recently, the USAF announced the formation of a composite wing. It combines F-15, F-16, and other aircraft to form a single unit capable of launching a strike under conditions of minimum coordination with units outside the wing.[6] Extending the concept to a restructured USAF of the late 1990s and early 2000s, a wing would have squadrons of F-15s, LANTIRN-equipped F-16s, and F-15Es as well as two or three tankers, two or three tactical airlift aircraft, and its own E-3A airborne warning and control system (AWACS) aircraft. The wing would be able to deploy as an entity and conduct a full spectrum of operations immediately, without extensive coordination or support from other wings.

Configuring a wing in this fashion reduces the need for extensive communications between bases, reduces the advance planning time required to coordinate strike tactics, and integrates the operational control of a strike package under a single wing commander. In order to train like we fight, the future configuration of Air Force wings may rely heavily on the composite wing concept.[7]

If the returning F-111s and F-15Es are incorporated into composite wings, several training problems will become apparent. First, once a new crew member is assigned to a squadron, some local or "top-off" training is necessary. All commands have a formal local area checkout program, which varies from a few training sorties to a formal course, that is integrated with the mission-ready checkout of the crew. These sorties have specific training goals and are not conducive to integrated strike training missions. Second, the specialized capabilities that make the F-111 or F-15E desirable

in the composite wing (PGM delivery, very-low-altitude flight, multiaircraft packages, and a wide variety of available weapons) require additional training missions dedicated to these tasks. After initial qualification, practice in a benign training scenario is required to build crews' confidence and refine their technique.

In the air-to-ground mission, for example, the replacement training unit (RTU) only briefly exposes and qualifies the new crew in conventional bombing from box-type flight patterns. Advanced "pop-up" attack profiles on tactical targets are practiced only after the crew is able to recognize when a poor attack should be broken off, correctly analyze the attack, and have confidence the next attack will be successful.

In an air-to-air mission, new F-15 pilots would not be assigned to fight in a "four-versus-many" scenario until they could demonstrate their ability to handle the complex decisions required. Training safety requires a step-by-step approach to more complex missions.

Task-specific sorties do not fit well into a large strike scenario because the training crew is not ready to meet the demands of timing, collision avoidance, and mutual support—it is still learning the precise tactics necessary to employ PGMs and other tactic-specific weapons. In short, training assets available to the composite wing will be competitively sought by each squadron according to its specific training requirements. This competition will be resolved at the wing scheduling office, but will require allocation of ranges and low-level training routes for task-specific formations of two, three, or four aircraft in lieu of large composite-raid packages. Instead of the wing training as a unit on a regular basis, integrated strike training will become an exceptional mission.

Training for differing climates and terrains further complicates training requirements. Early in the development of the training program, a decision must be made to deploy the wing as a unit or as individual squadrons to the temporary location. Deploying the wing as a unit has distinct advantages. The wing could train as it would fight—as a unit, employing all the coordination and integration required in combat.

The deployment would take advantage of all the specialized capabilities of the visited range. Those qualified in PGMs could use the deployment as a culmination for the home-station training program.

Ground crews would have to work out the complex logistics support for the variety of aircraft deployed. Bomb-loading crews would need to service specialized weapons in an unfamiliar setting.

The deployment base's support facilities could be in a variety of conditions, from bare base to full in-place support including billeting, underground fuel storage, recreational facilities, and so forth. Wendover Field in central Utah is a bare base with runway and control tower, but few other facilities. It is close to three well-equipped ranges and is ideally suited to an entire composite wing's deployment to a bare base.[8]

The most limiting factor in deploying an entire wing is the need for ramp space for up to 72 aircraft of varying sizes. Only one operational base near one of the ranges discussed in the previous chapter currently has sufficient ramp space to accept an entire composite wing: Mountain Home AFB—and if a composite wing were home-based there, that base would likely be unable to accommodate an additional wing of transient aircraft.

Even if a deployment site with enough ramp space could be found, little ramp space would remain for joint training by any deployed foreign forces. The sheer magnitude of support required for an entire wing virtually precludes its deployment to an already active air base.

Rather than deploying as an entire wing, the decision could be made to deploy as individual squadrons or portions thereof. While the overall demands on the deployment site would be considerably less, support crews would still have to work out the logistics. The squadron could still use the deployment as a culmination in a specialized training program. The smaller demand on the deployment base could allow for combined training operations with allied forces. Squadrons could rotate at the deployed site once all training goals were met.

The Weapons Training Deployment

A WTD scheme has been used in Europe for several years. WTDs allow USAFE crews to train in events that are impossible to accomplish at their home station. For air-to-air units, insufficient airspace is available in Germany to allow dogfights of four aircraft against four others. No area other than the range at Decimomannu AB, Italy, has an ACMI facility.[9] In the air-to-air training world, ACMI ranges are essential to fully training an air superiority crew.

USAFE air-to-ground wings have three ranges on which to train. Only two, however, are of sufficient size and capability for F-111 use. The first is Bardenas-Reales range, located near Zaragoza AB, Spain. The other is Konya range, located in the highlands of western Turkey and served by Incirlik AB, outside Adana.

Although the WTD concept was developed to provide necessary aircrew training, several ancillary benefits have been realized over the years. First, proficiency in mobility preparations and execution is maintained. USAFE wings are allocated range training time, associated airlift, and tanker support to allow each squadron a three-week deployment at a WTD base twice each year. The logistics required to operate one squadron at a remote location, establish routine maintenance schedules, and provide crew training are all coordinated to allow maximum use of aircraft and training resources during the WTD. This twice-a-year deployment routine keeps not only the logisticians proficient at loading and unloading C-130 transports

but also maintains aircrew proficiency in deployment procedures. This corporate knowledge is not lost through reassignment because everyone remains familiar with recurring deployment procedures.

WTDs also keep USAFE crews familiar with the other common climate of Europe—that in and around the Mediterranean Sea. All four WTD sites are located either on the Mediterranean itself or, as is the case with Zaragoza, are dominated by a similar climate.

Routine employment of training PGMs is done exclusively at Bardenas-Reales and Konya ranges. Weather, terrain, tactics, and crew proficiency all must come together in order to hit the target with the training weapon. A PGM "miss" because the target run was made too early in the morning drives home the importance of thermal contrast between the target and the surrounding terrain. Similarly, early morning and late afternoon target runs must avoid flying directly into the sun. All of the tactical considerations are highlighted in dropping a training bomb that costs several thousand dollars and is likely to be the only PGM the crew (whose performance is monitored by command authorities) will drop that year.

When the costs of training weapons are combined with the support costs for the deployed squadron, WTD training does not come cheap. The following table summarizes the costs for 12-aircraft deployments at Zaragoza and Incirlik ABs for a 90-day period. Actual WTDs vary in length depending on the number of squadrons each wing possesses, the length of training required, and other variables. The 90-day common denominator allows comparison of weapon systems and costs associated with a particular training site.

Aircraft	*Zaragoza*	*Incirlik*
F-16	$514K	$709K
F-111	$838K	$882K
F-4G	$605K	—

These costs reflect per diem, airlift support, and other known incidental expenses. Fuel and hourly operating costs of aircraft are not included; neither are annual variable costs of range maintenance ($290K in 1990) nor the costs of weapons.[10]

A June 1990 WTD study by the USAFE comptroller compared the costs associated with training in Europe and similar training in the United States. It concluded that US-based WTDs had similar costs, including required airlift.[11]

Ranges in the US offer more capabilities than those at European WTD bases. No European air-to-ground WTD range allows nighttime low-level flight at 200 feet above ground, daytime low-altitude flying at 100 feet, or live PGM weapon deliveries. Neither Zaragoza nor Incirlik has electronic combat threat simulators.[12] Several US ranges have all of these training

opportunities. To take advantage of the US ranges, USAFE wings have deployed biennially to Nellis AFB for various flag exercises for several years. The first USAFE WTD to Eielson AFB, Alaska, scheduled for September 1990, was canceled because Iraq invaded Kuwait.

United States-Based Weapons Training Deployments

This study's WTD concept could be used to complete the training of F-111 and F-15E crews returned from Europe. The proposed deployment scheme is, like the USAFE system, based on two deployments per year. One deployment would focus on combined training with allied forces. Ideally, such training would occur in the European theater. Aircrew training in Europe refamiliarizes the crews with European airspace control procedures and the ground controllers with the unique performance requirements of NATO aircraft. Periodic European deployments keep our forces trained with our allies, demonstrate resolve to maintain a European defense commitment, and reduce the need for active bases in Europe. However, should flight, political, or fiscal restrictions make training in Europe impractical, CFB Goose Bay offers a partial substitute.

A single squadron deployment to Europe fits well into the proposed composite wing concept. Consolidation of forces in Europe would not only reduce overall in-theater costs, but would maintain an integrated and forward-based fighting wing that is immediately deployable for any regional conflict.[13]

A squadron could complete its training in the remaining climates with four more deployments spaced over the following two years. Thus, crews would experience the required climates and terrains each 30 months while maintaining NATO familiarity. These remaining four deployments would concentrate on operating in the different weather conditions and using the special range assets unavailable at the home base.

One of the four deployments should be to Nellis AFB for a Red Flag exercise. This Red Flag deployment, coupled with a Maple Flag exercise the following year, would meet "flag exercise" participation goals.[14] In addition to the excellent joint (and often combined) training available during these exercises, the base in the Nevada highlands accustoms aircrews to the low humidity and clear air of the steppe climate and to operations in mountainous terrain. The Canadian deployment offers a continental climate in rolling, tree-covered terrain.

The remaining two deployments require proper timing to take advantage of local weather. Alaskan-range weather from spring to fall simulates the northern part of central and eastern Asia. The Avon Park range in central Florida has near-tropical weather during summer months. Luke AFB,

Arizona, and Wendover Field, Utah, offer desert climates in the southwestern United States.

A typical two and one-half year deployment schedule for F-111s based at Cannon AFB is shown below.

Timing	*Deployment Base*	*Range*	*World Climate*
Jan–Feb	MacDill AFB	Avon Park	Tropical
Jul–Aug	CFB Cold Lake	Cold Lake	Continental
Feb–Mar	Nellis AFB/Red Flag	TFWC	Semidesert
Aug–Sep	RAF Lakenheath	UK	European
Jan–Feb	Seymour Johnson AFB	Cherry Point	Eastern Asian

Likewise, a proposed deployment schedule for F-15Es at Seymour Johnson AFB, North Carolina, could be:

Timing	*Deployment Base*	*Range*	*World Climate*
Feb–Mar	Nellis AFB/Red Flag	TFWC	Semidesert
Jul–Aug	CFB Goose Bay	Goose Bay	European
Jan–Feb	CFB Cold Lake	Cold Lake	Continental
Jun–Jul	Eielson AFB	Alaskan	Central/Eastern Asian
Jan–Feb	MacDill AFB	Avon Park	Tropical

Thus, in about 30 months, each crew will have trained in the world's major climates and terrains. Increasing the cycle to more than 30 months would create "experience" problems from the operations perspective; reducing the cycle to under two years would cause problems for routine, periodic aircraft inspections and other maintenance functions.

Current personnel reassignment policy includes a four-year tour for married members and a three-year tour for unmarried members. Increasing the cycle to greater than 30 months could easily preclude a new unmarried flier's being fully trained in all climates. In many cases, local checkout programs could preclude full exposure even in the proposed 30-month rotation. Effective since late 1987, USAFE policy is to complete theater indoctrination flights and ground training within 45 duty days of arrival. Subsequent qualification in specialized weapons and equipment takes about six months, after which the crew member is able to exploit the aircraft's special capabilities.

Should new crew members miss the first two deployments because they have not completed all local checkouts, a cycle of up to 30 months should allow them to deploy to all training sites. Unfortunately, the wing cannot use their experience to train the next new fliers because their tour is over as they complete the last deployment.

Flight leaders and instructors are the core of the in-squadron training program. Without these leaders, the continuation training program cannot succeed. Typically, new fliers take about two years of active flying to upgrade to instructor or multiship flight lead. Their leadership is important

for day-to-day in-flight supervision and training, but is critical for deployed operations. Expanding the WTD cycle to more than 30 months wastes the unmarried crew member's expertise.

Conversely, reducing the cycle to less than two years causes difficulties in maintenance functions. Conducting five deployments of nine-week duration in 24 months requires that a new WTD begin every 20 weeks or so. The 11-week break between WTDs would necessarily be consumed with returning and repositioning spare parts for the next deployment, periodic major inspections, and attending to personal affairs.

During WTDs, the maintenance branch must keep maintenance functions operating at two locations. Often the deployed site is sent extra spare parts and equipment at the expense of the home station. This is not as unreasonable as it may sound because the WTD is expensive and the sortie rate is often higher than home station operations. Therefore, it is prudent to send the best people and equipment to support the more demanding environment.

When WTDs are too close to each other, prepositioning of spares and equipment becomes difficult or impossible. A case in point was when RAF Lakenheath deployed three squadrons to Incirlik AB in the spring of 1990 for five weeks each. Six weeks after the last squadron returned to England, the wing began another WTD to Zaragoza AB. Airlift and sea lift were not available to return all spare parts and support equipment to England and then ship it to Spain. Some equipment moved directly from Turkey to Spain, some returned to England and deployed later, while a third segment came directly from RAF Lakenheath. The fairly straightforward deployment became three times more complex logistically.

In fact, there were insufficient spare engines for the operation in Spain. The aircraft deployed without spares. If an engine required replacement, the aircraft would have to remain grounded until an engine could be airlifted to Zaragoza. Unfortunately, because of the intense flying at Incirlik, there were none to be had for the first few days of the Zaragoza deployment.[15]

Aircrew operations were not as complicated by the compressed time to deploy as maintenance functions were. The greatest challenges were to the lead squadron into Spain. The lead squadron on any deployment must coordinate billeting, operations and maintenance functions, messing facilities, transportation, and a host of other details. To coordinate the myriad details for the squadron's Spain deployment, two officers shortened their training at Incirlik and returned to Lakenheath (as an advance team from the lead squadron) before the remainder of their squadron.

Summary

Even with investment to improve and/or enlarge current ranges, F-111 and F-15E crews will continue to receive a portion of their training away from home base. Training in a variety of climates will continue to be

required for the deep-strike, PGM-equipped force of the future. Air and ground crews enjoyed from four to five months of prewar training as a warm-up to Operation Desert Storm; such in-theater training time may not be available for the next conflict. Only by periodic exposure to differing climates will flight and support crews be ready to go when called.

Two short-term deployments per year can complete training for worldwide operations with emphasis on European operations in cycles of 30 months. A total of five deployments over the two and one-half years would provide adequate training for most climates. One of the five should be to Europe or Canada to maintain combined training with our allies. One WTD should be to a major flag exercise at Nellis AFB. The remaining three, carefully timed to take advantage of the desired seasonal weather, would be sufficient to complete climatic training for a worldwide mission. Unfortunately, familiarity with European air traffic procedures and NATO air traffic controllers would be maintained only if the unit deploys to USAFE—unless a creative, and expensive, ground controller training program is incorporated into the CFB Goose Bay training scheme.

A WTD each six months allows sufficient time for performing maintenance recovery and local checkouts, and for attending to family matters without sacrificing the experience gained by fliers on a three-year assignment. Those with a four-year tour could be relied upon to be leaders for up to 18 months of their assignment.

The current composite wing proposal, if implemented stateside, will cause some training problems. Training for specialized capabilities must be included in the wing's training concept. Integrated multiaircraft missions would likely be the exception rather than the rule.

Further, commanders must decide whether the training will be given to wings or to individual squadrons. Wings deployed "en masse" will need either a bare base or another base with sufficient room to accommodate up to 72 aircraft with associated personnel and equipment. While squadron-sized WTDs interrupt integrated training at home, combined training with squadrons of our NATO allies in Europe or Canada is practical only in squadron-sized deployments. Squadron WTDs also allow the individual members to concentrate on specialized training unique to the WTD range rather than the integration of a large force, which can be practiced at home.

Composite wings overseas would also fit well with squadron-type WTDs rather than wing-type deployments. By rotating a squadron out of the overseas composite wing every two or three months, the composite wing would maintain a higher level of overall readiness because only one would be "new" at a time. If the wing deployed as a whole, each crew member would need to complete orientation sorties before beginning routine training. During the familiarization training, the wing would find itself somewhat less mission-capable while the aircrews gained confidence in overseas operations. By staggering the rotations of individual squadrons, the wing would retain corporate operations proficiency. Less time would be required

for the new squadron to be fully mission capable as opposed to the time required for an entire wing to complete orientation flights.

Notes

1. Col Arnold Franklin, 27th Tactical Fighter Wing commander, Cannon AFB, N.Mex., telephone interview with author, 6 March 1991.
2. Briefing, 4440th Tactical Fighter Training Group, subject: Red Flag 2000, Nellis AFB, Nev., 20 February 1991.
3. Headquarters Tactical Air Command, *COMTAC Exercise Plan 80, "Red Flag"* (Langley AFB, Va.: Headquarters Tactical Air Command), 1 October 1980, iii.
4. Lt Col Craig S. Ghelber, 48th TFW/CVI, RAF Lakenheath, UK, telephone interview with author, 27 May 1991.
5. The NATO program is outlined in Allied Command's ACE Directive Number 80-54, *Exercise Ample Gain and Ample Train Planning, Directive*, 15 August 1990. It directs units to periodically visit, both announced and unannounced, other NATO bases for cross servicing.
6. Julie Bird, "McPeak lays out rationale for composite wing," *Air Force Times* 51, no. 38 (29 April 1991): 4.
7. Gen Merrill A. McPeak, USAF, "For the Composite Wing," *Airpower Journal* 4, no. 3 (Fall 1990): 10–11.
8. DOD Flight Information Publication (Enroute) IFR Supplement, US, 30 May 1991–25 July 1991 (Defense Maritime Agency, Aerospace Center, St. Louis, Mo.), B-536.
9. A proposed ACMI range located in the North Sea is not currently operational.
10. Col F. F. Acker, USAFE director of Fighter Operations and Training, to author, letter, subject: Information for Thesis Report, 15 August 1990.
11. Col T. J. Stubblebine, USAFE assistant deputy chief of staff/comptroller, to author, letter, subject: Initial Progress/Thesis Paper (your ltr, 27 July 1990), 14 August 1990.
12. Phil Thayer, Headquarters USAFE/DCA, interview with author at Ramstein AB, 1 June 1990.
13. Michael A. Dornheim, "US Air Force May Move to Mixed Role Tactical Wings," *Aviation Week & Space Technology*, 5 November 1990, 99.
14. *COMTAC 80*, iii.
15. Maj Billy G. Meador, 48th Component Repair Squadron commander, RAF Lakenheath, UK, telephone interview with author, 24 April 1991.

Chapter 4

Conclusions and Recommendations

NATO will wrestle with its new charter for some time to come. Until this new charter is developed or another organization takes its place, European security remains unsettled. Fiscal constraints and the "new world order" are currently demanding downsized military forces from both the US and its allies. World politics have moved away from a primarily bipolar world toward one with many centers and regional interests.

Regional Conflicts and Precision Guided Munitions

Tomorrow's smaller US force must be able to meet its declared NATO commitment, but it must also respond to regional conflicts. While the likelihood of war in Europe has decreased, the probability of regional conflicts jeopardizing US interests has not. Regional conflicts can span all levels, from conventional army-to-army battles to relatively small insurgencies.

The success of US PGM-capable forces in Desert Storm suggests that they will be committed to the next conflict, whatever its scope and size. Their unique capabilities allowed the US to minimize collateral damage, offered economy of force, and minimized the necessity for restriking targets.

To realize the benefits of these specialized munitions and aircraft, fighter-bomber crews must continually train in PGM employment. Current continuation training programs require reexamination to ensure that our crews are ready for the challenges of the new world order. These challenges may require the use of PGM forces in any type of climate and terrain, worldwide. Training forces for a worldwide commitment requires not only familiarization with a wide range of world climates and terrains but also routine practice in deployment.

European-based F-15Es will have insufficient resources to train in low-level flying and weapons employment. Since the closing of Wheelus Field, Tripoli, Libya, in 1970, USAFE has become totally dependent on Bardenas-Reales and Konya ranges for realistic PGM training. Aircraft based in the UK routinely deploy to these sites to practice low-level tactics in unfamiliar terrain, employment of both guided and unguided weapons against overland tactical targets (as opposed to target rafts in the Irish or North seas), and deployment procedures. Even if a replacement range for

Wheelus were found, the crews would still lack employment experience in a wide variety of climates and terrains.

F-111F crews, returned from England and based at Cannon AFB, will suffer the same fate. There are sufficient numbers of training routes to support a large amount of low-level training, but these routes are mostly limited to the steppe climate and the flat terrain of eastern New Mexico or Colorado. Some routes do use the eastern mountain ranges of these two states, but there are too few of them. Without a continuation training program to train the F-111F crews in other climates and terrains, they will rapidly lose their proficiency in low-ceiling, limited-visibility areas like those common in Europe.

USAFE and PACAF share a common responsibility to supply crews and aircraft for war fighting. The RTU and home station training programs are sufficient to meet both initial qualification and basic familiarization with the advanced systems. The training challenge is to enable the crews to employ these systems under "uncanned" and war-like situations.

The opportunity to do this type of training exists today on North American ranges. The combined assets of Canada and the US, with some enhancements, can provide realistic training for virtually all world terrains and climates. In fact, a rotation to the training sites around North America could suffice for future air-to-ground training except for two issues: the loss of NATO ground controller combined-force training and the lack of a tropical rain forest climate in North America. The controller issue would most easily be solved through biennial exercise deployments to Europe. Continuing use of Howard AFB, Panama, is not guaranteed; therefore, training for tropical rain forest conditions may not be possible without building new facilities.

United States-Based Weapons Training Deployment

A deployment rotation scheme among the well-equipped ranges, timed to take advantage of the weather, can offer worldwide training over the duration of the crew's assignment. Patterned after USAFE's WTD concept, these short-duration TDYs can take advantage of the local training environment to expose mission-ready crews to the necessary climates and terrains. USAFE's experience suggests two deployments per year.

A stepwise approach to US-based WTDs seems most appropriate since each training range has uniquely characteristic climate, terrain, and facilities. The first requirement is to determine the temporary training capacity at each base. Canadian bases, in particular, could involve extended lead times for negotiation of increased activity.

A host of details needs careful consideration for a successful deployment at both US and Canadian bases. Billeting, fuels, munitions (both practice and live), laser firing clearances (where required), flying operations support

facilities (such as crew briefing and debriefing facilities), and maintenance work areas must be obtained before trying a large deployment. One possibility to partially test the deployment's feasibility is a deployment of four or eight aircraft and limited maintenance support. Such a deployment has been used in USAFE when fiscal constraints precluded a full WTD.[1]

Since each base will have unique facilities to support TDY aircraft training, the recommended bases should be rank-ordered for implementation. The factors bearing on relative rank are related to logistic limitations and the training lost if use of the base is delayed due to facility shortfalls in support of flight operations.

The F-111s from RAF Lakenheath are illustrative of the lost training issue. At the cease-fire in Desert Storm, the F-111F crews had had nearly three months of continuous operations in desert climate and terrain. Coupled with the deployment to Incirlik AB in the spring of 1990 and the day-to-day flying in England, the F-111 crews had received good training in a wide variety of climates and terrains. Once these aircraft begin returning to the US in 1992, however, this broad level of experience will soon disappear if no program is in place to keep their crews' worldwide readiness high. The Avon Park and Alaskan ranges could be ready for these returning crews, but planning needs to start well before their arrival in the United States.

The WTD bases in USAFE have dedicated facilities for deployed squadrons. Specific aircraft hangar space and parts storage space are allocated to maintenance. Operations personnel have individual buildings to support the day-to-day requirements of planning, briefing, and flight administration support. Sufficient billeting is either available or can be contracted in the local economy. Improvements necessary if the proposed bases are to supply the necessary support must be identified and budgeted for as soon as possible. The proposed bases already support fighter-type operations, so the need to build additional facilities should be very low. Where sufficient hard-sided buildings do not exist for supervision and day-to-day operations, civil engineering RED HORSE teams could erect temporary buildings.

More than just buildings and ramp space are needed, however; several ranges need modifications or improvements in their procedures and capabilities. Both Blair Lake and R-2205 should eliminate laser restrictions and allow PGMs; electronic combat threat simulators (both manned and unmanned) are needed at Goldwater, Cherry Point, UTTR, and Goose Bay; and an inert bombing program is needed at Goose Bay.

Flag Participation and Combined Operations

The 25 percent USAF personnel drawdown and the 33 percent reduction in fighter wings should allow annual participation in Red Flag–type exercises by all USAF tactical units. If not, Air Combat Command, USAFE, and

PACAF should make the 15-month participation goal mandatory. This participation would not only provide mountainous and steppe climate training but would also focus the training program on combined operations. Red Flag/Maple Flag's demanding, realistic nature requires crews to be ready to fly and fight aggressively. There is no room for poorly or inadequately trained crews. Additionally, Red Flag/Maple Flag exercises are particularly useful in permitting previous participants to pass on their combined operations techniques. Flag exercises are currently the only USAF forum where this exchange occurs and where the techniques can be practiced by a large number of pilots and WSOs.

Combined operations under NATO plans and procedures could be routinely available at CFB Goose Bay. Operations there would be exclusively combined in nature and would emphasize the best employment techniques for each allied asset. US operations at Goose Bay would help maintain our crews' proficiency in allied procedures and low-level training programs displaced from Europe.

Additionally, inclusion of both Red Flag and NATO forces training sites in Canada would enhance the employment options of the commander since the crews will have routinely trained with NATO allies. For example, a practice airfield attack with F-15E defense suppression aircraft and UK Tornado runway cutters is one option available for combined training with the Royal Air Force. And several NATO allies have already begun exporting their low-level training to North America at CFB Goose Bay, providing an excellent opportunity to keep allied procedures and attack techniques fresh in US crews' minds. The German low-flying prohibition will likely increase Goose Bay's use by NATO forces looking for a good low-level training area.

Europe-Based F-15E Continuation Training

The F-15Es to be stationed at Lakenheath will be in a training predicament similar to that which the F-111Fs left. That is, even though the aircraft are dedicated to supporting NATO in a central European war, they cannot train over that area. Still, those crews, more than their US-based counterparts, will maintain some flexibility in planning their continuation training. The combining of day-to-day practice bombing on UK coastal ranges with continued deployments to Zaragoza and Incirlik will remain their primary weapons training method. However, Garvie Island will still be the only PGM target in the UK, keeping Strike Eagle crews dependent on WTD sorties for PGM training.[2] Because PGM training capability in North America is much greater than in Europe, and US-based WTD costs are estimated to be similar to those of European training sites, it seems prudent for USAFE to consider moving the WTDs from Europe to North American sites.

Further, realistic combined-force training with allies other than the RAF will be nonexistent unless the RAF hosts a multinational exercise. With

routine low-flying training effectively prohibited everywhere except the UK, only the RAF retains the capability to hold routine exercises using large forces, low altitudes, and realistic scenarios with multinational forces. The British Ministry of Defense routinely includes some multinational forces in RAF exercises, but the size of these exercises is insufficient to train all of NATO's forces regularly. Thus, regular deployments to CFB Goose Bay and Red Flag are needed to keep US F-15E crews current in realistic combined operations.

The training program for US PGM-capable forces will undoubtedly continue evolving over the next decade to meet changing threats from around the world. The future effectiveness of US and allied forces in meeting those threats will be determined by the training program changes made today. US training programs must undergo careful scrutiny and evolution *now*, else our forces will be inadequately trained for the next conflict. We were fortunate to have a five-month lead for Desert Storm; we should not count on being so fortunate again.

Notes

1. Four aircraft at a time from the 48th TFW, RAF Lakenheath, UK, were cycled in and out of Zaragoza AB during the fall of 1989. Each four-ship unit stayed overnight and flew four range missions before returning to England on day two.
2. Garvie Island is the only live-ordnance target in the United Kingdom.

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